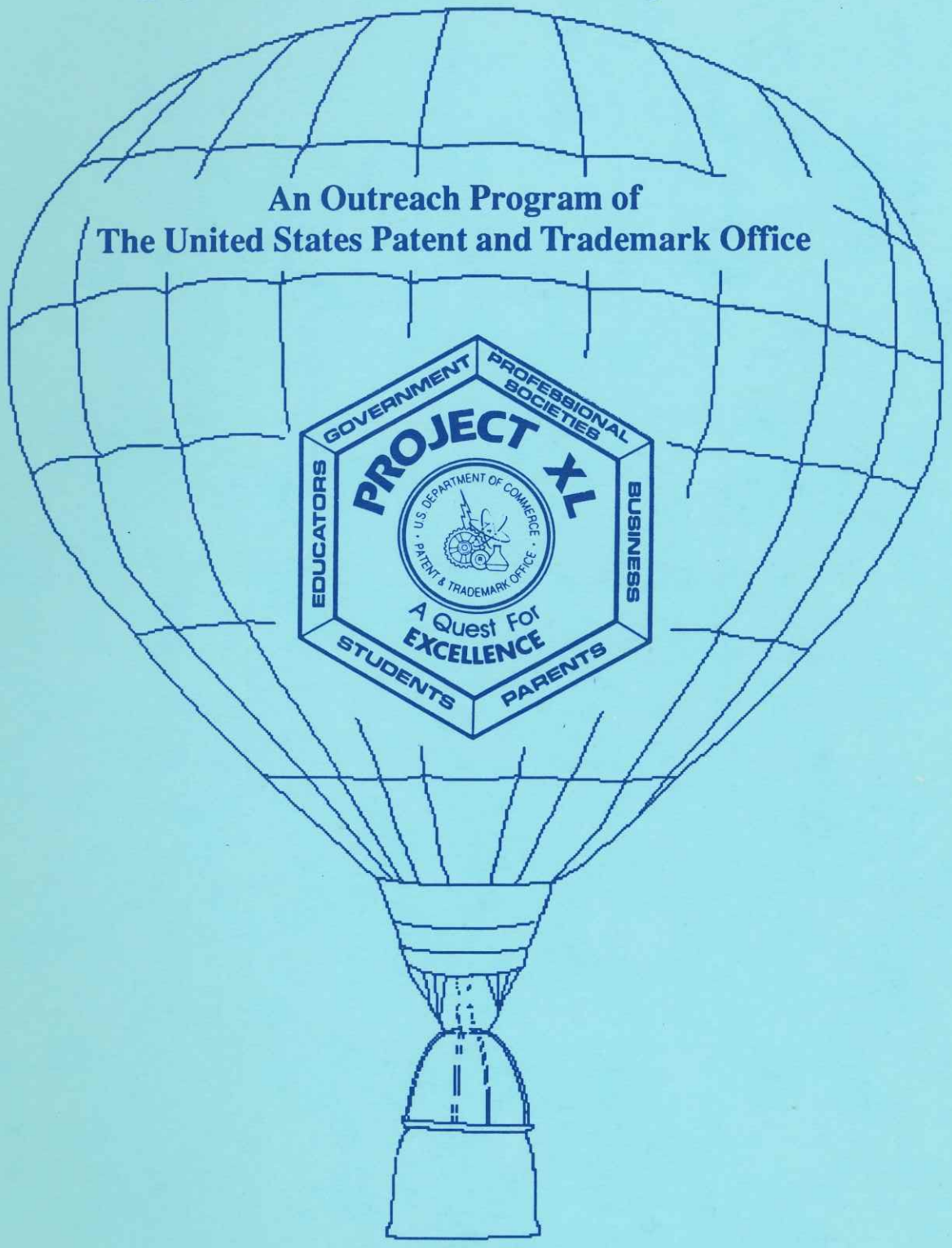
THE INVENTIVE THINKING CURRICULUM PROJECT

An Outreach Program of
The United States Patent and Trademark Office



The activities featured in this project
are appropriate for all student populations

Bicentennial Edition
200 years of Inventive Thinking 1790 - 1990.

PROJECT XL SUPPORT GROUPS

- Association of Collegiate Entrepreneurs (ACE)
- American Chemical Society
- Center for Creative Learning
- Intellectual Property Owners, Inc.
- Junior Engineering and Technical Society
- National Association for the Advancement of Colored People/Afro-Academic, Cultural, Technological and Scientific Olympics
- National Council of Intellectual Property Law Associations
- National Council of Teachers of Mathematics
- National Society of Professional Engineers
- National Technical Association
- RISE Foundation
- Small Business Administration
- Society of American Inventors
- State University College/Buffalo, Center for Studies in Creativity
- TIES Magazine, Drexel University
- U.S. Departments of:
  - Agriculture
  - Commerce*
  - Defense
  - Education
  - Energy
  - Labor
- U.S. National Commission on Libraries and Information Science
- Weekly Reader, Field Publications

* The Patent and Trademark Office is an agency of the Department of Commerce. Other Commerce agencies are also supportive of PROJECT XL and/or leaders in their own right of educational partnerships. They are: Bureau of the Census, Minority Business Development Agency, National Institute of Standards and Technology, National Oceanic and Atmospheric Administration, National Telecommunications and Information Administration, U.S. Travel and Tourism Agency, and the Office of Civil Rights.

The Inventive Thinking Curriculum Project

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INVENTIVE THINKING CURRICULUM PROJECT

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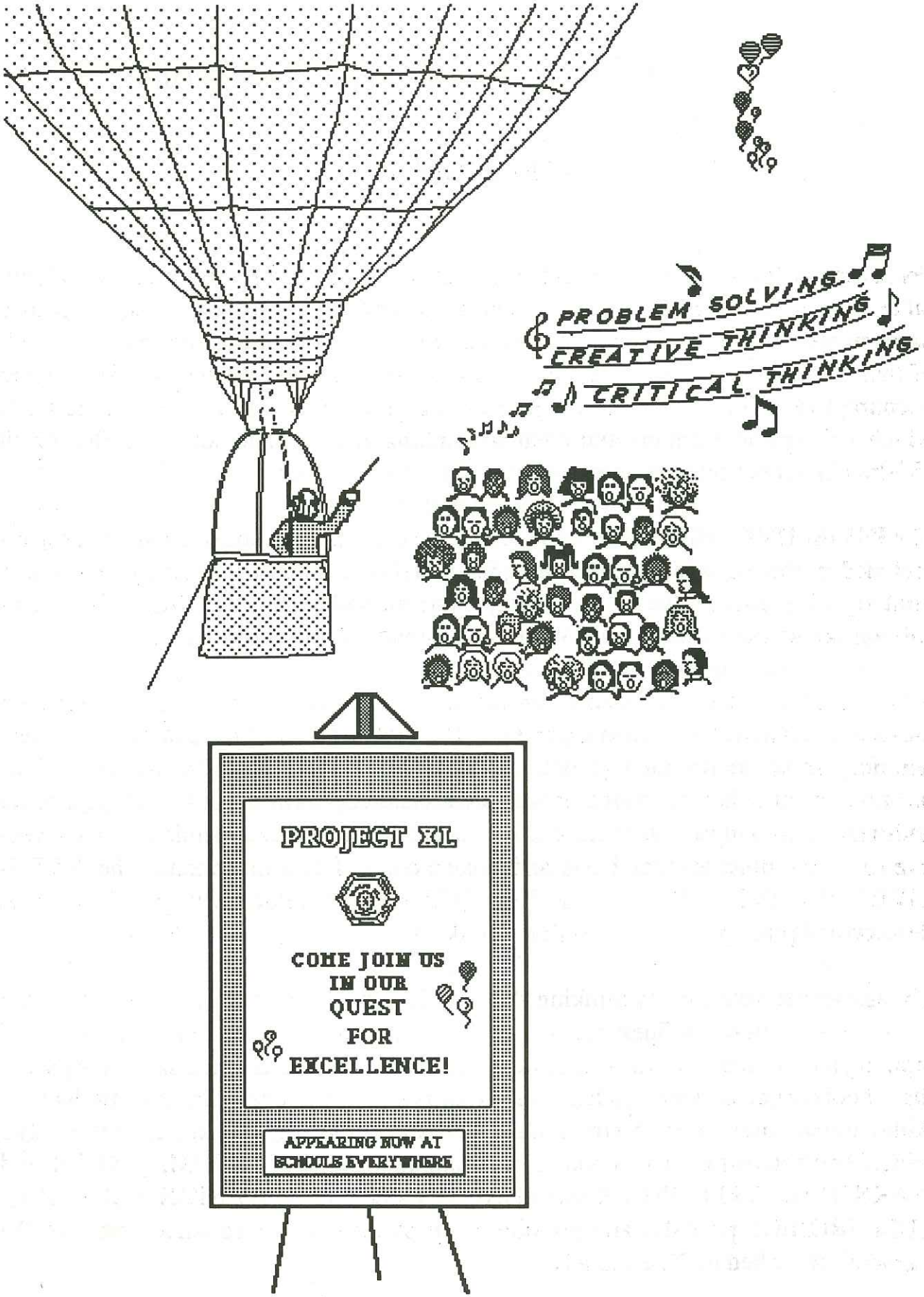

PROBLEM SOLVING
CREATIVE THINKING
CRITICAL THINKING
PROJECT XL
COME JOIN US
IN OUR
QUEST
FOR
EXCELLENCE!
APPEARING NOW AT
SCHOOLS EVERYWHERE

INTRODUCTION

For several years, the U. S. Patent and Trademark Office has been working in concert with other Federal agencies, corporations, and associations to bring into national focus a number of grassroots school programs promoting thinking skills instruction. As a result of that effort, PROJECT XL has been initiated as a national partnership designed to encourage proliferation of such programs and to develop new programs and materials which will promote critical and creative thinking and problem-solving skills for all children in our nation's schools.

The INVENTIVE THINKING CURRICULUM PROJECT is one of the many projects included in this national outreach program. It should be used in conjunction with a thinking skills program as a means of applying critical and creative thinking, and problem-solving skills through the activity of creating an innovation or invention.

When a student is asked to "invent" a solution to a problem, the student must draw upon previous knowledge, skills, and experience. The student also recognizes areas where new learnings must be acquired in order to understand or address the problem. This information must then be applied, analyzed, synthesized, and evaluated. Through critical and creative thinking and problem-solving, ideas become reality as children create inventive solutions, illustrate their ideas, and make models of their inventions. The INVENTIVE THINKING CURRICULUM PROJECT provides children with opportunities to develop and practice higher order thinking skills.

Thoughout the years, many thinking skills models and programs have been generated from among America's finest educators, seeking to describe the essential elements of thinking and/or to develop a systematic approach to teaching thinking skills as a part of the school curricula. Three such models/descriptions are illustrated in this introduction. Although each uses different terminology, each model describes similar elements of either critical or creative thinking, or both. A review of the models of BLOOM, TAYLOR, and ISAKSEN and TREFFINGER show how the INVENTIVE THINKING CURRICULUM PROJECT provides an opportunity for students to "experience" most of the elements described in these models.

BENJAMIN BLOOM'S MODEL

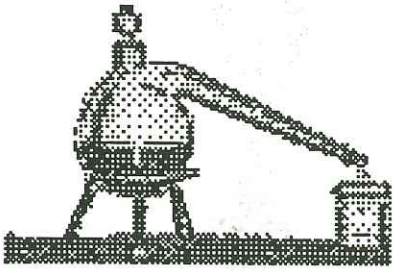
Perhaps most familiar to educators is "BLOOM'S taxonomy". Bloom describes the major areas in the cognitive domain. This information is drawn from the Taxonomy of Educational Objectives, Handbook 1; Cognitive Domain (1956). The taxonomy begins by defining KNOWLEDGE as the remembering of previously learned material. Knowledge, according to Bloom, represents the lowest level of learning outcomes in the cognitive domain. Knowledge is followed by COMPREHENSION, the ability to grasp the meaning of material and goes just beyond the knowledge level. Comprehension is the lowest level of understanding. APPLICATION is the next area in the hierarchy and refers to the ability to use learned material in new and concrete situations. This may include rules, methods, laws, concept principles, and theories. Application requires a higher level of understanding than comprehension.

In ANALYSIS, the next area of the taxonomy, the learning outcomes require an understanding of both the content and the structural form of material. Next is SYNTHESIS, which refers to the ability to put parts together to form a new whole. Learning outcomes at this level stress creative behaviors with a major emphasis on the formulation of new patterns or structures. The last level of the taxonomy is EVALUATION. Evaluation is concerned with the ability to judge the value of material for a given purpose. The judgments are to be based on definite criteria. Learning outcomes in this area are the highest in the cognitive hierarchy because they incorporate or contain elements of knowledge, comprehension, application, analysis, and synthesis. In addition, they contain conscious value judgments based on clearly defined criteria. The activity of inventing encourages the four highest levels of learning—application, analysis, synthesis, and evaluation—in addition to knowledge and comprehension.

CALVIN TAYLOR'S MODEL - TALENTS UNLIMITED

The second model is introduced by Calvin Taylor in Chapter XI and is discussed in a summary chapter by Carol Schlichter in Joseph Renzulli's book entitled Systems and Models for Developing Programs for the Gifted and Talented (1986). The Taylor model describes the Talent Areas as Productive Thinking, Communication, Planning, Decision Making and Forecasting. This work is best known as TALENTS UNLIMITED, a program of the National Diffusion Network of the U. S. Department of Education. The Taylor model incorporates both the critical and creative elements of thinking. Rather than a taxonomy, this is a thinking skills model that describes the essential elements of thinking, beginning with the academic talent and then incorporating the other Talent areas, as described in more detail below.

PRODUCTIVE THINKING promotes creative thinking in the Taylor model. It suggests thinking of many ideas, varied ideas, unusual ideas, and adding to those ideas. COMMUNICATION has six elements which include: give many, varied, single words to describe something; give many, varied, single words to describe feelings; think of many, varied things that are like another thing in a special way; let others know that you understand how they feel; make a network of ideas using many, varied and complete thoughts; tell your feelings and needs without using words. PLANNING requires that students learn to tell: what they are going to plan; the materials that they will need; the steps that they will need to accomplish the task; and the problems that might occur. DECISION MAKING teaches the student to: think of the many, varied things that could be done; think more carefully about each alternative; choose one alternative that they think is best; and give many, varied reasons for the choice. FORECASTING is the last of the five talents and requires students to make many, varied predictions about a situation, examining cause and effect relationships. Every element of the TAYLOR model is used when a child invents.



CREATIVE PROBLEM SOLVING MODEL

The third model developed by Scott Isaksen and Donald Treffinger as described in the book Creative Problem Solving: The Basic Course by Isaksen and Treffinger (1985) and published in Buffalo, New York, by Bearly Limited, also describes both critical and creative thinking. CREATIVE THINKING is described as making and communicating connections to think of many possibilities; think and experience in various ways and use different points of view; think of new and unusual possibilities; and guide in generating and selecting alternatives. CRITICAL THINKING is described as analyzing and developing possibilities to: compare and contrast many ideas; improve and refine ideas; make effective decisions and judgments; and provide a sound foundation for effective action. These definitions are used in a six-stage, problem-solving process. A brief description of each of the six stages follows:

1. Mess Finding: Just what's the mess that needs cleaning up, the situation that demands our attention? We have to identify and acknowledge this first before we can proceed.

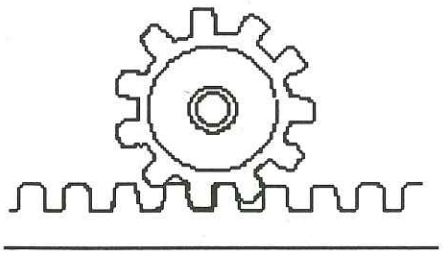
2. Data Finding: Once the general mess is defined, the next stage involves "taking stock"—unearthing and collecting information, knowledge, facts, feelings, opinions, and thoughts to sort out and clarify your mess more specifically. What do you know about the situation and what do you still need to know?

3. Problem Finding: Now that your data is collected, you need to formulate a "problem statement" that expresses the "heart" of the situation. You must try to put aside the common assumption that you "already know what the problem is" and try to state the problem in such a manner as to invite novel perspectives on it.

4. Idea Finding: This is the state in which you brainstorm as many ideas or alternatives as possible for dealing with your problem statement. Don't evaluate your ideas at this point, merely list them as an idea pool from which you'll draw in putting together a variety of solutions to your problem.

5. Solution Finding: Now that you have a number of ideas that can serve as possible solutions to your problem, it's time to evaluate them systematically. To do this you have to generate a variety of criteria and select the most important for your problem. (Is it cost? Expediency? Pleasure? Time involvement? Etc.) In this way you'll be able to identify and evaluate the relative strengths and weaknesses of possible solutions.

6. Acceptance Finding: Having decided upon a solution, it's time to formulate a Plan of Action to implement your solution. Determine what kind of help you'll need, what obstacles or difficulties might get in the way, and what specific short- and long-term steps you are going to take to rid yourself of that original mess!



Now that you have reviewed these examples, you will see the critical and creative thinking and problem-solving skills and talents that can be applied through the activity of inventing. The INVENTIVE THINKING CURRICULUM PROJECT that follows can be used across all disciplines and grade levels and with all children. It can be integrated with all curricular areas and used as a means of applying the concepts or elements of any thinking skills program that may be in use in your school district. Participation in this project will provide your students with an excellent opportunity to "experience" the highest levels of thinking. Activities can be adapted to the developmental and academic needs of the class.

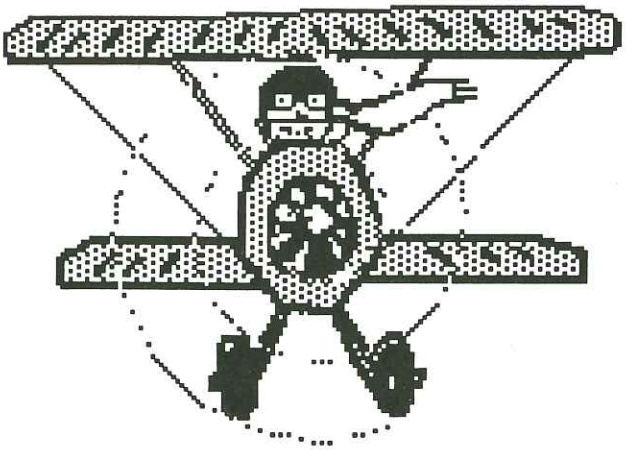
We hope that you will join PROJECT XL in this national effort, by developing your own program for promoting the teaching of inventive thinking and problem-solving skills. Use the INVENTIVE THINKING CURRICULUM PROJECT as a springboard for capturing the imagination, interest, and creativity that each of us has within our reach. The children of this nation are our very best investment in tomorrow. Our future will be brighter if we add a big "T" for THINKING to the BASIC 3 R'S of the school curricula.

INVENTIVE THINKING CURRICULUM PROJECT

A special project that provides a unique opportunity for children of all ages to develop their problem-solving and inventive thinking skills in an integrated learning activity can be implemented at your school. Just use the procedures, activities, and guidelines in this booklet to create your own exciting program.

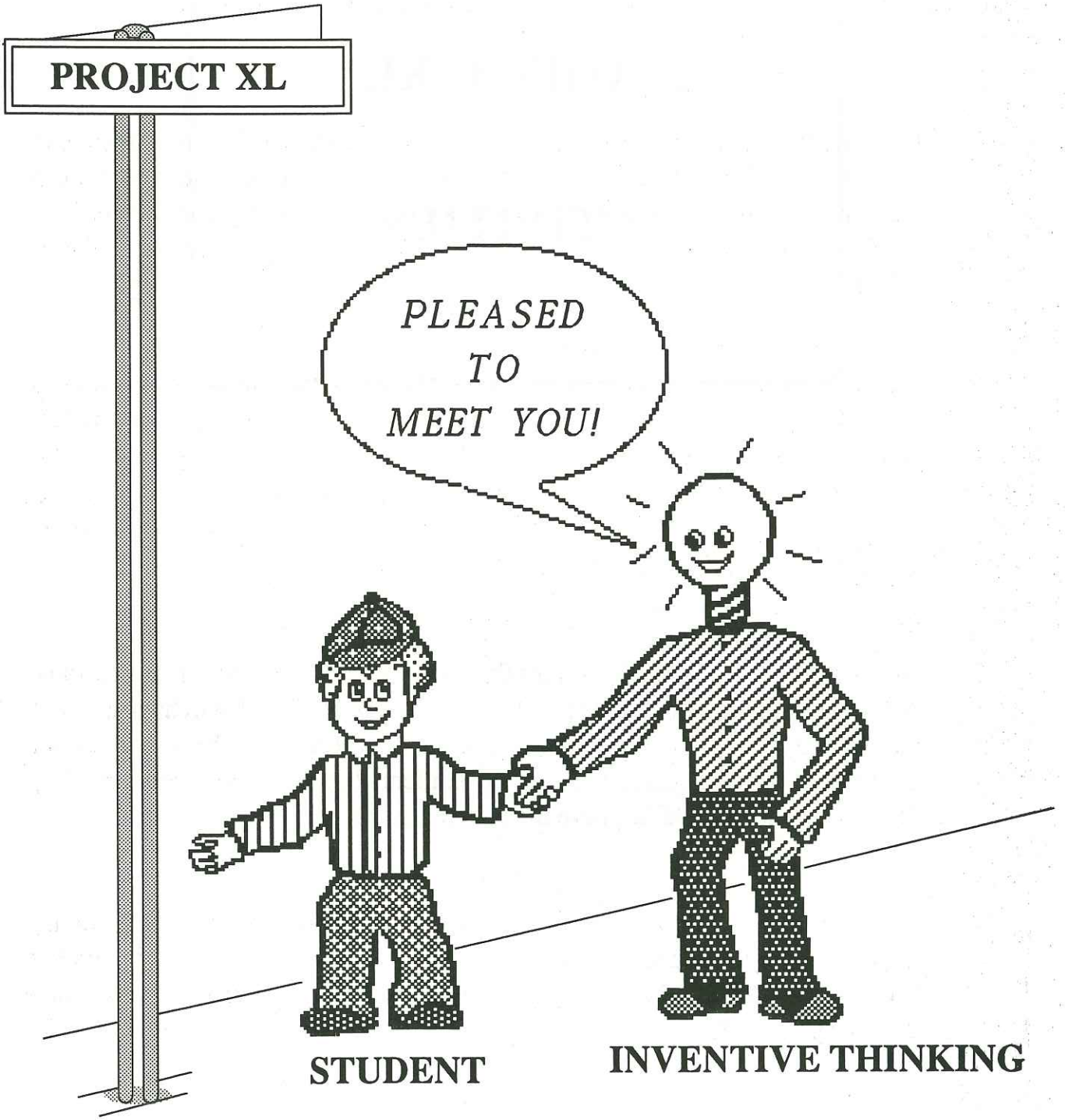
Children of all ages are talented and creative. This project will give them an opportunity to develop their creative potential and synthesize and apply knowledge and skills by creating an invention or innovation to solve a problem, just as a "real" inventor would.

Check Enrichment section of the INVENTIVE THINKING CURRICULUM PROJECT for a listing of programs and competitions in which you may wish to participate.



PROJECT XL

ACTIVITIES


PROJECT XL
PLEASED TO MEET YOU!
STUDENT
INVENTIVE THINKING

ACTIVITY #1

INTRODUCING INVENTIVE THINKING

"Imagination is more important than knowledge, for imagination embraces the world."
(Albert Einstein)

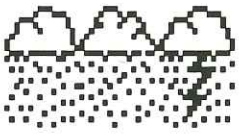
1. Read the stories in the back of this guide or copy them for the students to read themselves. Ask students, "How did these inventors get their ideas? How did they make their ideas a reality?" Locate books in your library about inventors, inventions, and creativity. Older students can locate these references themselves.

2. Invite a local inventor to speak to the class. Since local inventors are not usually listed in the phone book, you can find them by calling a local PATENT ATTORNEY or your local PATENT LAW ASSOCIATION. Your community may also have an INVENTOR'S SOCIETY that you may contact. If not, most of your major companies have a RESEARCH and DEVELOPMENT department made up of people who think inventively for a living.

3. Next, ask the students to look for the things in the classroom that are inventions. All the inventions in the classroom that have a U.S. PATENT will have a patent number. One such item is probably the pencil sharpener. Tell them to check out their house for patented items. Let the students list all of the inventions they discover. What would improve these inventions?

4. In order to guide your students through the inventive process, a few preliminary lessons dealing with creative thinking will help set the "mood." Begin with a brief explanation of brainstorming and a discussion on the rules of brainstorming (see page 10).

BRAINSTORMING



BRAINSTORMING is a process of spontaneous thinking used by an individual or by a group of people to generate numerous alternative ideas while deferring judgment. Introduced by Alex Osborn in his book Applied Imagination, brainstorming is the crux of each of the stages of all problem-solving methods.

RULES FOR BRAINSTORMING

- NO CRITICISM ALLOWED. People tend to automatically evaluate each suggested idea—their own as well as others. Both internal and external criticism are to be avoided while brainstorming. Neither positive nor negative comments are allowed. Either type inhibits the free flow of thought and requires time which interferes with the next rule. Write each spoken idea down as it is given and move on.

- WORK FOR QUANTITY. Alex Osborn stated that "Quantity breeds Quality." People must experience a "braindrain" (get all the common responses out of the way) before the innovative, creative ideas can surface; therefore, the more ideas, the more likely they are to be quality ideas.

- HITCHHIKING WELCOME. Hitchhiking occurs when one member's idea produces a similar idea or an enhanced idea in another member. All ideas should be recorded.

- FREEWHEELING ENCOURAGED. Outrageous, humorous, and seemingly unimportant ideas should be recorded. It is not uncommon for the most "off-the-wall" comment to be one wherein lies the solution for the problem.

ACTIVITY #2

PRACTICING THE CREATIVE PART OF INVENTIVE THINKING

1. Cultivate the following Creative Thinking Processes described by Paul Torrance and discussed in The Search for Satori and Creativity (1979).

FLUENCY .....the production of a great number of ideas.

FLEXIBILITY .....the production of ideas or products that show a variety of possibilities or realms of thought.

ORIGINALITY ....the production of ideas that are unique or unusual.

ELABORATION ..the production of ideas that display intensive detail or enrichment.

For practice in elaboration, have pairs or small groups of students choose a particular idea from the brainstorming list and add the flourishes and details that would develop the idea more fully.

Allow the students to share their innovative and inventive ideas!

2. Once your students have become familiar with the rules of brainstorming and the creative thinking processes, Bob Eberle's SCAMPER technique for brainstorming could be introduced.

SUBSTITUTE? ..... Who else instead? What else instead? Other ingredient? Other material? Other power? Other place?

COMBINE? ..... How about a blend, an alloy, an ensemble? Combine purposes? Combine appeals?

ADAPT? ..... What else is like this? What other idea does this suggest? Does past offer parallel? What could I copy?

MINIFY? ..... Odor, form, shape? What to add? More time?

AGNIFY? ..... Greater frequency? Higher? Longer? Thicker?

PUT TO OTHER USES? . New ways to use as is? Other uses if modified? Other places to use? Other people to reach?

ELIMINATE? ..... What to subtract? Smaller? Condensed? Miniature? Lower? Shorter? Lighter? Omit? Streamline? Understate?

Interchange components? Other pattern? ..... REVERSE?

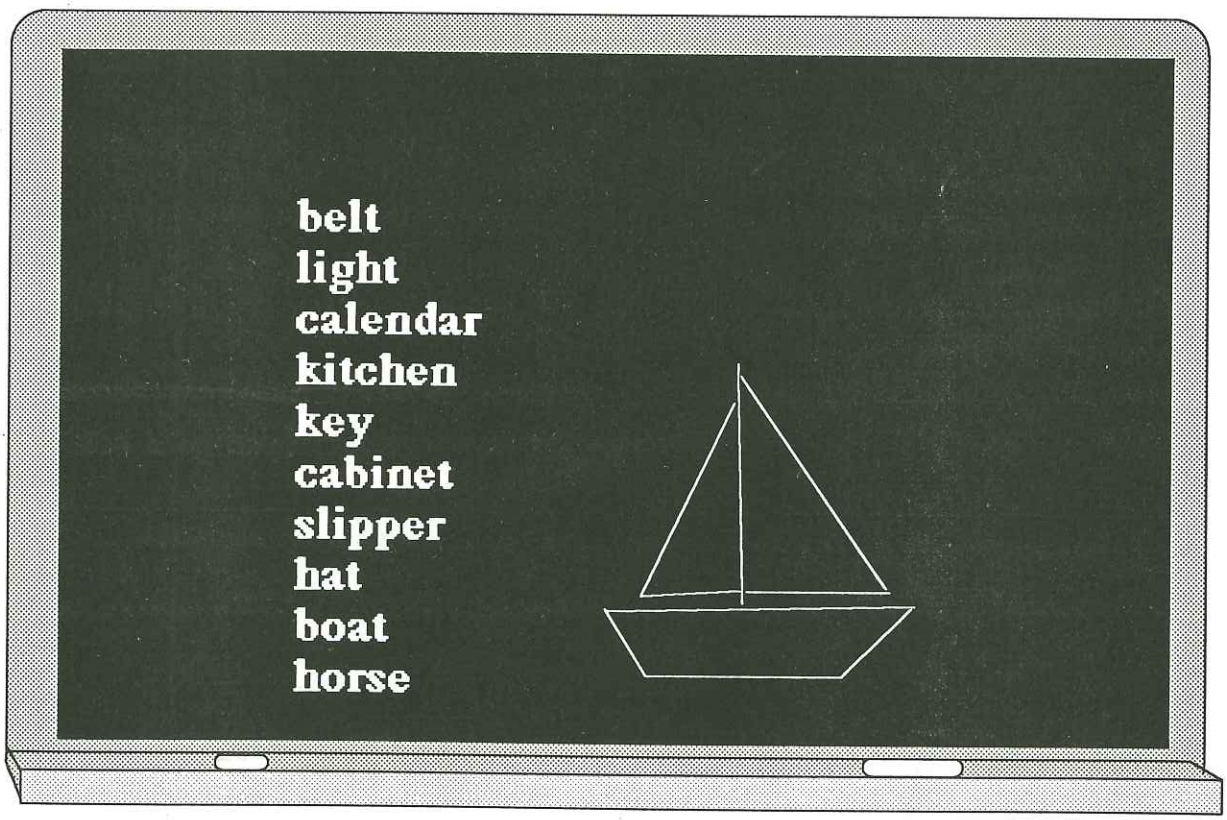
REARRANGE? ..... Other layout? Other sequence? Transpose cause and effect? Change pace? Transpose positive and negative? How about opposites? Turn it backward? Turn it upsidedown? Reverse roles?

3. Bring in any object or use objects around the classroom to do the following exercise. Ask the students to list many new uses for a familiar object by using the SCAMPER technique with regard to the object. You could use a paper plate to begin with, and see how many new things the students will discover. Make sure to follow the rules for brainstorming in Activity #1.

4. Using literature, ask your students to create a new ending to a story, change a character or situation within a story, or create a new beginning for the story that would result in the same ending.

5. Put a list of objects on the chalkboard. Ask your students to combine them in different ways to create a new product.

Let the students make their own list of objects. Once they combine several of them, ask them to illustrate the new product and explain why it might be useful.



ACTIVITY #3

PRACTICING INVENTIVE THINKING WITH THE CLASS

Before your students begin to find their own problems and create unique inventions or innovations to solve them, you can assist them by taking them through some of the steps as a group.

1. Finding the Problem. Let the class list problems in their own classroom that need solving. Use the "brainstorming" technique from Activity #1. Perhaps your students never have a pencil ready, as it is either missing or broken when it is time to do an assignment. Select one problem for the class to solve using the following steps:

    a. Find several problems. Select one to work on.
    b. Analyze the situation.
    c. Think of many, varied, and unusual ways of solving the problem.

    List the possibilities. Be sure to allow even the silliest possible solution, as creative thinking must have a positive, accepting environment in order to flourish.

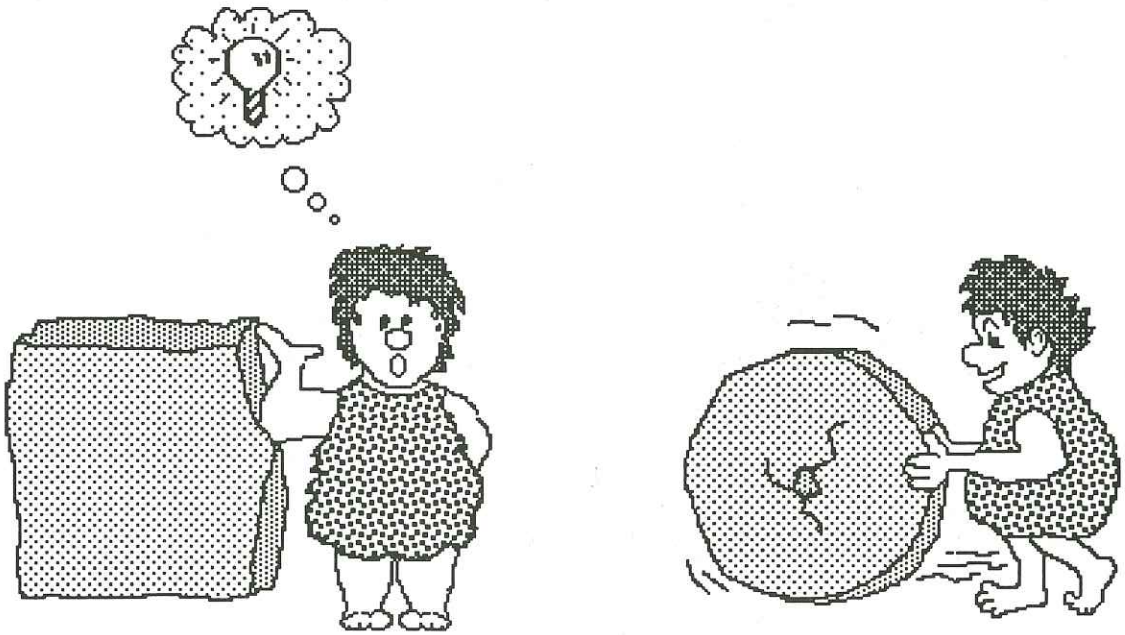
2. <u>Finding a Solution</u>.

a. Select one or more possible solutions to work on. You may want to divide into groups if the class elects to work on several of the ideas.

b. Improve and refine the idea(s).

c. Share the class or individual solution(s)/invention(s) for solving the class problem.

Solving a "class" problem and creating a "class" invention will help students learn the process and make it easier for them to work on their own invention projects.



ACTIVITY #4

DEVELOPING AN INVENTION IDEA

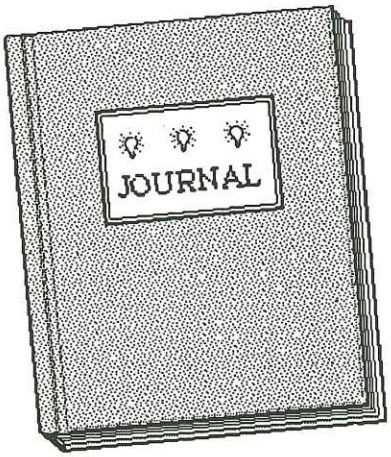
Now that your students have had an introduction to the inventive process, it is time for them to find a problem and create their own invention to solve it.

1. Begin by asking your students to conduct a survey. Tell them to interview everyone that they can think of to find out what problems need solutions. What kind of invention, tool, game, device, or idea would be helpful at home, work, or during leisure time? (Sample survey available in the back of the INVENTIVE THINKING CURRICULUM PROJECT.)

2. Ask the students to list the problems that need to be solved.

3. Next comes the DECISION-MAKING process. Using the list of problems, ask the students to think of which "problems" would be possible for them to work on. They can do this by listing the pro's and con's for each possibility. Predict the outcome or possible solution(s) for each problem. Make a DECISION by selecting one or two problems that provide the best options for an inventive solution. (Duplicate the Planning and Decision-Making Framework at the back of the INVENTIVE THINKING CURRICULUM PROJECT.)

4. Begin an Inventor's Log or Journal. A record of your ideas and work will help you develop your invention and protect it when completed. (Sample log sheet available in the back of the INVENTIVE THINKING CURRICULUM PROJECT.)



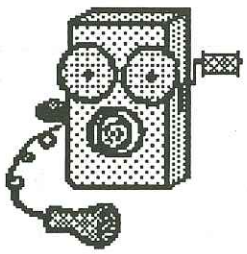
RULES FOR AUTHENTIC JOURNAL KEEPING

RULES

- ✓ Using a bound notebook, make notes each day about the things you do and learn while working on your invention.
- ✓ Record your idea and how you got it.
- ✓ Write about problems you have and how you solve them.
- ✓ Write in ink and do not erase.
- ✓ Add sketches and drawings to make things clear.
- ✓ List all parts, sources, and costs of materials.
- ✓ Sign and date all entries at the time they are made and have them witnessed.

5. To illustrate why record-keeping is important, read the following story about Daniel Drawbaugh who said that he invented the telephone, but didn't have one single paper or record to prove it.

Long before Alexander Graham Bell filed a patent application in 1875, Daniel Drawbaugh claimed to have invented the telephone. But since he had no journal or record, the Supreme Court rejected his claims by four votes to three. Alexander Graham Bell had excellent records and was awarded the Patent for the telephone.



ACTIVITY #5

BRAINSTORMING FOR CREATIVE SOLUTIONS

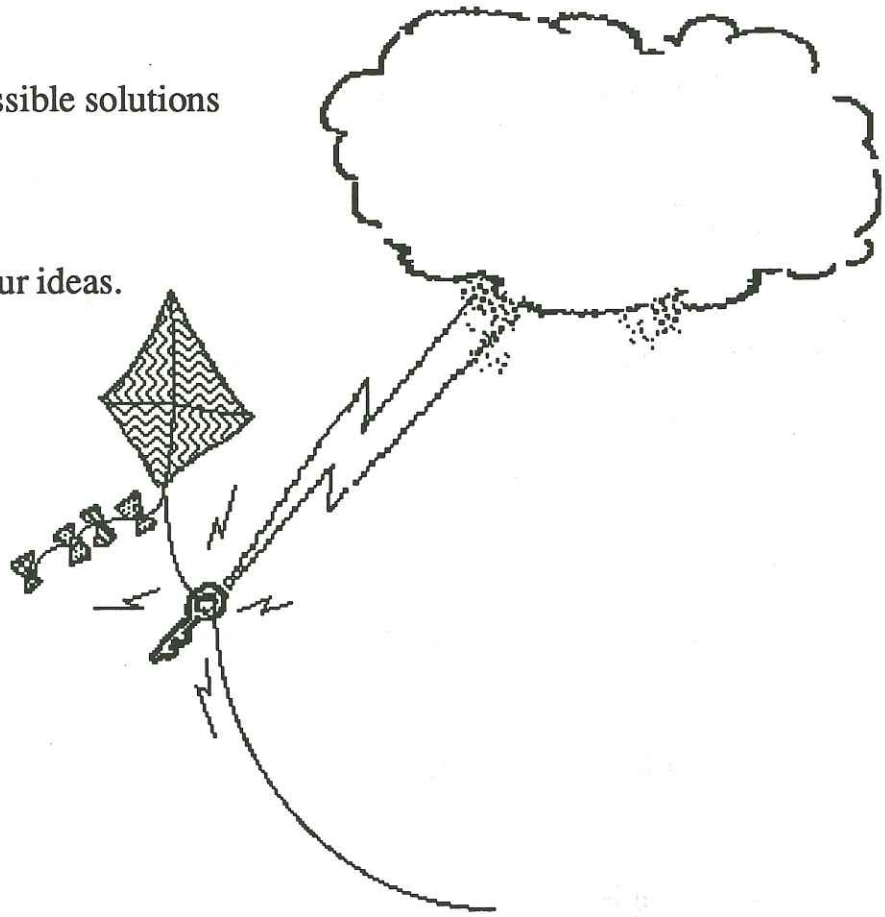
Now that the students have one or two problems to work on, they must take the same steps that they did in solving the "class" problem in Activity #3. These steps could be listed on the chalkboard or a chart.

1. Analyze the problem(s). Select one to work on.

2. Think of many, varied, and unusual ways of solving the problem. List all of the possibilities. Be non-judgmental. (See "Brainstorming" in Activity #1 and SCAMPER in Activity #2.)

3. Select one or more possible solutions to work on.

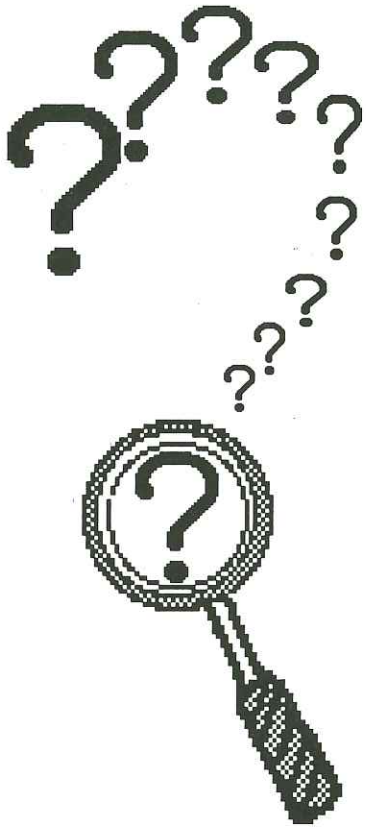
4. Improve and refine your ideas.



ACTIVITY #6

PRACTICING THE CRITICAL PART OF INVENTIVE THINKING

Now that your students have some exciting possibilities for their invention projects, they will need to use their critical thinking skills to narrow down the possible solutions. They can do this by asking themselves the following questions about their inventive idea:



1. Is my idea practical?
2. Can it be made easily?
3. Is it as simple as possible?
4. Is it safe?
5. Will it cost too much to make or use?
6. Is my idea really new?
7. Will it withstand use, or will it break easily?
8. Is my idea similar to something else?
9. Will people really use my invention? (Survey your classmates or the people in your neighborhood to document the need or usefulness of your idea.)

ACTIVITY #7

COMPLETING THE INVENTION

When students have an idea that meets most of the above qualifications, they need to PLAN how they are going to complete their project. The following PLANNING technique will save them a great deal of time and effort:

1. Identify the problem and possible solution. Give your invention a NAME.

2. List the materials needed to illustrate your invention and to make a model of it. You will need paper, pencil and crayons or markers to draw your invention. You might use cardboard, paper, clay, wood, plastic, yarn, paperclips, and so forth to make a model. You might also want to use an art book or a book on model-making from your school library.

3. List, in order, the steps for completing your invention.

4. Think of the possible problems that might occur. How could you solve them?

5. Complete your invention. Ask your parents and teacher to help with the model.

REMEMBER!

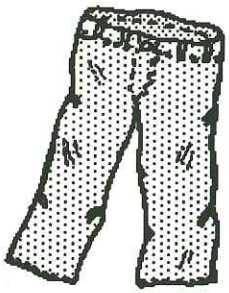
- WHAT - Describe the problem.
- MATERIALS - List the materials needed.
- STEPS - List the steps to complete your invention.
- PROBLEMS - Predict the problems that could occur.

ACTIVITY #8

NAMING THE INVENTION

An invention can be named in one of the following ways:

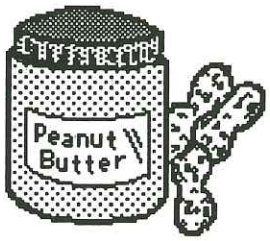
1. Using the inventor's name.



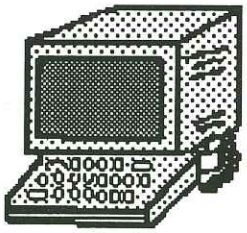
- Levi Strauss = LEVI'S® jeans
- Louis Braille = Braille Alphabet System

2. Using the components or ingredients of the invention.

- Root Beer
- Peanut Butter



3. With initials or acroynms.



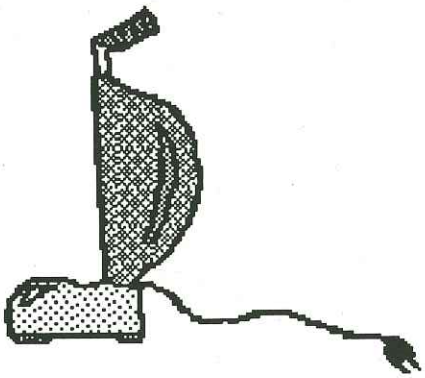
- IBM®

4. Using word combinations (notice repeated consonant sounds and rhyming words).

- KIT KAT®
- HULA HOOP®
- PUDDING POPS®
- CAP'N CRUNCH®

5. Using the product's function.

- SUPERSEAL®
- DUSTBUSTER®
- vacuum cleaner
- hairbrush
- earmuffs



Students can be very fluent when it comes to listing ingenious names of products out on the market. Solicit their suggestions and have them explain what makes each name effective. Each student should generate names for his own invention.

ACTIVITY #9

OPTIONAL MARKETING ACTIVITIES

1. DEVELOPING A SLOGAN OR JINGLE.

Have the students define the terms "slogan" and "jingle." Discuss the purpose of having a slogan.

Sample slogans and jingles:

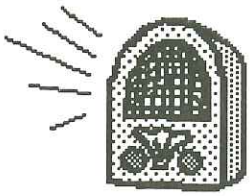
"Things go better with Coke."
"COKE IS IT!®"
"TRIX ARE FOR KIDS®"
"OH THANK HEAVEN FOR 7-ELEVEN®"
"TWOALLBEEFPATTIES®..."
"GE: WE BRING GOOD THINGS TO LIFE!®"

Your students will be able to recall <u>many</u> slogans and jingles! When a slogan is named, discuss the reasons for its effectiveness. Allow time for thought in which the students can create jingles for their inventions.

2. CREATING AN ADVERTISEMENT

For a crash course in advertising, discuss the visual effect created by a television commercial, magazine, or newspaper advertisement. Collect magazine or newspaper ads that are eyecatching—some of the ads might be dominated by words and others by pictures that "say it all." Students might enjoy exploring newspapers and magazines for outstanding advertisements. Have students create magazine ads to promote their inventions. (For more advanced students, further lessons on advertising techniques would be appropriate at this point.)

3. RECORDING A RADIO PROMO



A radio promo could be the icing on a student's advertising campaign! A promo might include facts about the usefulness of the invention, a clever jingle or song, sound effects, humor... the possibilities are endless! Students may choose to tape record their promos for use during the INVENTION CONVENTION.

4. ADVERTISING ACTIVITY

Collect 5-6 objects and give them new uses. For instance, a toy hoop could be a waist reducer and some strange looking kitchen gadget might be a new type of mosquito catcher. Use your imagination! Search everywhere— from the tools in the garage to the kitchen junk drawer—for fun objects. Divide the class into small groups, and give each group one of the objects to work with. The group is to give the object a catchy name, write a slogan, draw an ad, and record a radio promo. Stand back and watch the creative juices flow! Variation: Collect magazine ads and have the students create new advertising campaigns using a different marketing angle.

ACTIVITY #10

PARENT INVOLVEMENT

Few, if any, projects are successful unless the child is encouraged by the parents and other caring adults. Once the children have developed their own, original ideas, they should discuss them with their parents. Together, they can work to make the child's idea come to life by making a model. Although the making of a model is not necessary, it makes the project more interesting and adds another dimension to the project. You can involve parents by simply sending a letter home to explain the project and let them know how they may participate. One of your parents may have invented something that they can share with the class. (See sample parent letter at the back of the INVENTIVE THINKING CURRICULUM PROJECT.)

ACTIVITY #11

YOUNG INVENTORS' DAY

Plan a YOUNG INVENTORS' DAY so that your students can be recognized for their inventive thinking. This day should provide opportunities for the children to display their inventions and tell the story of how they got their idea and how it works. They can share with other students, their parents, and others.

When a child sucessfully completes a task, it is important that he be recognized for the effort. All children who participate in the INVENTIVE THINKING CURRICULUM PROJECT are winners.

The U. S. Patent and Trademark Office has prepared a certificate that can be copied and given to all children who participate and use their inventive thinking skills to create an invention or innovation. This award, signed by the U. S. Commissioner of Patents and Trademarks, Harry F. Manbeck, Jr., is included at the back of this booklet.

ACTIVITY #12

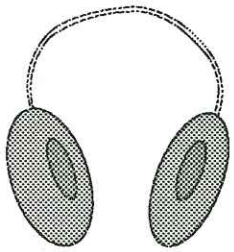
ENRICHMENT

The following stories about Great Thinkers and Inventors will help to motivate your students and enhance their appreciation of the contributions of inventors to the American way of life.

As students read these stories, they will also realize that "inventors" are male, female, old, young, minority, and majority. They are ordinary people who follow through with their creative ideas to make their dreams a reality.

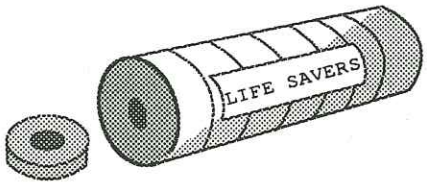
1. GREAT THINKERS AND THEIR INVENTIONS

Earmuffs. "Baby, It's Cold Outside" may have been the song running through 13 year old Chester Greenwood's head one cold December day in 1873. To protect his ears while ice-skating, he found a piece of wire, and with his grandmother's help, padded the ends. In the beginning, his friends laughed at him. However, when they realized that he was able to stay outside skating long after they had gone inside freezing, they stopped laughing. Instead, they began to ask Chester to make ear covers for them, too. At age 17 Chester applied for a patent. For the next 60 years Chester's factory made earmuffs, and earmuffs made Chester rich!!



BAND-AID®. At the turn of the century, Mrs. Earl Dickson, an inexperienced cook, often burned and cut herself. Mr. Dickson, a Johnson and Johnson employee, got plenty of practice in hand bandaging! Out of concern for his wife's safety, he began to prepare bandages ahead of time so that his wife could apply them by herself. By combining a piece of surgical tape and a piece of gauze, he fashioned the first crude adhesive strip bandage!

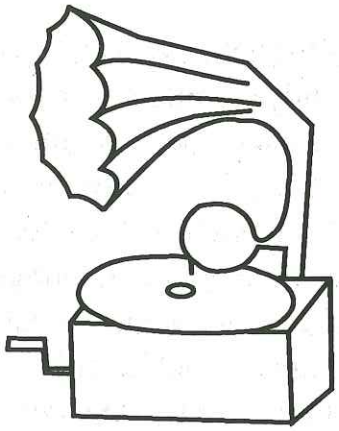
LIFE SAVERS®Candy. During the hot summer of 1913, Clarence Crane, a chocolate candy manufacturer, found himself facing a dilemma. When he tried to ship his chocolates to candy shops in other cities they melted into gooey blobs. To avoid dealing with the "mess," his customers were deferring their orders until cool weather. In order to retain his customers, Mr. Crane needed to find a substitute for the melted chocolates. He experimented with hard candy which wouldn't melt during shipment. Using a machine designed for making medicine pills, Crane produced small, circular candies with a hole in the middle.
The birth of LIFE SAVERS®!



FRISBEE®. The term FRISBEE® did not always refer to the familiar plastic disks we visualize flying through the air. Long ago (over 100 years ago), in Bridgeport, Connecticut, William Russell Frisbie owned the Frisbie Pie Company and delivered his pies locally. All of his pies were baked in the same type of 10" round tin with a raised edge, wide brim, six small holes in the bottom, and "Frisbies Pies" on the bottom.

Playing catch with the tins soon became a popular local sport. However, the tins were slightly dangerous when a toss was missed. It became the Yale custom to yell "Frisbie" when throwing a pie tin. In the 40's when plastic emerged, the pie-tin game was recognizedas a manufacturable and marketable product. (Note: FRISBEE®is a registered trademark of Wham-O Mfg. Co.)

2. THOMAS EDISON AND OTHER YOUNG INVENTORS



If I were to tell you that Thomas Alva Edison had shown signs of inventive genius at an early age,you probably would not be surprised. Mr. Edison achieved enormous fame with his lifelong contributions of volumes of inventive technology. He received the first of his 1,093 U.S. patents by age 22. In the book, Fire of Genius, Ernest Heyn reported on a remarkable resourceful young Edison—though some of his earliest tinkering clearly lacked merit.

By the age of six, Thomas Edison's experiments with fire were said to have cost his father a barn. Soon after that, it is reported that young Edison tried to launch the first human balloon by persuading another youth to swallow large quantities of effervescing powders to inflate himself with gas. Of course, the experiments brought quite unexpected results!

Chemistry and electricity held great fascination for this child, Thomas Edison. By his early teens, he had designed and perfected his first real invention, an electrical cockroach control system. He glued parallel strips of tinfoil to a wall and wired the strips to the poles of a powerful battery—quite a shock for the unsuspecting insect.

As a dynamo of creativity, Mr. Edison stood as decidedly unique; but as a child with a curious, problem-solving nature, he was not alone. Here are some more "inventive children" we grew to know and appreciate:

- At age 14, one schoolboy invented a rotary brush device to remove husks from wheat in the flour mill run by his friend's father. The young inventor's name? Alexander Graham Bell.

- At 16, another of our junior achievers saved pennies to buy materials for his chemistry experiments. While still a teenager, he set his mind on developing a commercially viable aluminum refining process. By age 25, Charles Hall received a patent on his revolutionary electrolytic process.

- While only 19 years old, another imaginative young person designed and built his first helicopter. In the summer of 1909, it very nearly flew. Years later, Igor Sikorsky perfected his design and saw his early dreams change aviation history.

Scores of childhood problem-solvers abound. Perhaps you've heard about:

- Samuel Colt's childhood experience with underwater explosives;
- Fourteen-year-old Robert Fulton's manually operated paddlewheel; and
- Guglielmo Marconi's early mechanical/electrical tinkering.

Even the father of television, Philo T. Farnsworth, conceived his optical scanning idea at the tender age of 14.

3. GREAT WOMEN INVENTORS

Inventions tell something about the inventor's place in the society in which (s)he lives, a closeness to certain kinds of problems, and possession of certain skills. It is not surprising that up until the mid 20th century, women's inventions were often related to childcare, housework, and healthcare, all traditional female occupations. In recent years, with access to specialized training and broader job opportunities, women are applying their creativity to many new kinds of problems, including those requiring high technology.

While women have frequently come up with new ways to make their work easier, they have not always received credit for their ideas. Some stories about early women inventors show that women often recognized that they were entering "a man's world", and shielded their work from the public eye by allowing men to patent their inventions.

• Although Eli Whitney received a patent for a cotton gin, Catherine Greene is said to have posed both the problem and the basic idea to Whitney. Furthermore, according to Matilda Gage, (Women as Inventor, 1883), his first model, fitted with wooden teeth, did not do the work well, and Whitney was about to throw the work aside, when Mrs. Greene proposed the substitution of wire to catch the cotton seeds.

Other women inventors and their discoveries:

• Margaret Knight, remembered as "the female Edison", received some 26 patents for such diverse items as a window frame and sash, machinery for cutting shoe soles, and improvements to internal combustion engines. Her most significant patent was for machinery that would automatically fold and glue paper bags to create square bottoms, an invention which dramatically changed shopping habits. Workmen reportedly refused her advice when first installing the equipment because, "after all, what does a woman know about machines?"

• Sarah Breedlove Walker, the daughter of former slaves, was orphaned at seven and widowed by 20. Madame Walker is credited with inventing hair lotions, creams, and an improved hair styling hot comb. But her greatest achievement may be the development of the Walker system, which included a broad offering of cosmetics, licensed Walker agents, and Walker schools, which offered meaningful employment and personal growth to thousands of Walker agents, mostly black women. Sarah Walker was the first American woman self-made millionaire.

• Bette Graham hoped to be an artist, but circumstances led her into secretarial work. Bette, however, was not an accurate typist. Fortunately, she recalled that artists could correct their mistakes by painting over them with gesso, so she invented a quick drying "paint" to cover her typing mistakes. Bette first prepared the secret formula in her kitchen using a hand mixer, and her young son helped to pour the mixture into little bottles. In 1980, the Liquid Paper Corporation which Bette Graham built was sold for over $47 million.

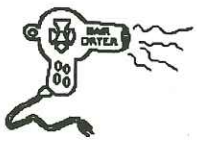
• Ann Moore , a Peace Corps volunteer, saw how African women carried babies on their backs by tying cloth around their bodies, leaving both hands free for other work. When she returned to the United States she designed a carrier which became the popular Snugli®. Recently Ms. Moore received another patent for a carrier to conveniently transport oxygen cylinders. People needing oxygen for breathing assistance, who were previously confined to stationary oxygen tanks, can now move about more freely. Her company now sells several versions including lightweight backpacks, handbags, shoulder bags, and wheelchair/walker carriers for portable cylinders.

• Stephanie Kwolek, one of Dupont's leading chemists, discovered the "miracle fiber", Kevlar, which has five times the strength of steel by weight. Uses for Kevlar are seemingly endless, including ropes and cables for oil drilling rigs, canoe hulls, boat sails, automobile bodies and tires, and military and motorcycle helmets. Many Viet Nam veterans and police officers are alive today because of protection provided by bullet-proof vests made from Kevlar. Because of its strength and lightness, Kevlar was chosen as the material for the Gossamer Albatross, a pedal airplane flown across the English Channel.

• Gertrude B. Elion, 1988 Nobel laureate in Medicine, and Scientist Emeritus with Burroughs Wellcome Company, is credited with the synthesis of two of the first successful drugs for Leukemia, as well as Imuron, an agent to prevent the rejection of kidney transplants, and Zovirax, the first selective antiviral agent against herpes virus infections. Researchers who discovered AZT, a breakthrough treatment for AIDS, used Elion's protocols.

Did you know

- windshield wipers were patented by Mary Anderson in 1903?
- dandruff shampoo was patented by Josie Stuart in 1903?
- a dishwasher was patented by Josephine Cochrane in 1914?
- the first disposable diaper was patented by Marion Donovan in 1951?



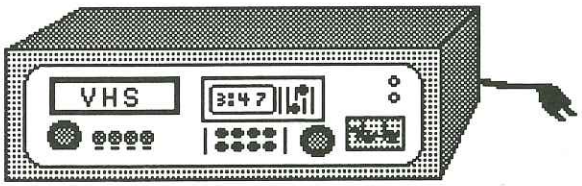
- a compact portable hair dryer was patented by Harriett J. Stern in 1962?
- a dough product for frozen pizza was patented by Rose Totino in 1979?
- the Melitta Automatic Drip Coffee Maker was patented by Melitta Benz in Germany in 1908?

Much of the material in this section was drawn from the Minnesota Historical Society Exhibit, "Her Works Praise Her, Inventions by Women". For further information on women inventors, you may contact the Minnesota Historical Society's Traveling Exhibition Department at (612) 297-4497.

4. GREAT MINORITY INVENTORS

Between 1863 and 1913, approximately 1,200 inventions were patented by black inventors. Many more were unidentified because they hid their race to avoid discrimination. Some sold their inventions to white men. The following stories are about a few of the great minority inventors. To learn more, you can obtain the film "From Dreams to Reality: A Tribute to Minority Inventors," at no charge, from the Patent and Trademark Office. You can request this video from your local Patent Depository Library or by writing to:

The Office of Equal Employment Programs
U. S. Patent and Trademark Office
Crystal Park 1, Room 600
Washington, DC 20231
(703) 557-1692

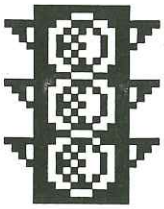


This video is free of charge and can be borrowed for use in your school.

• Elijah McCoy. Have you ever heard of the term "real McCoy?" That term may apply to a famous black inventor by the name of Elijah McCoy. He earned about 50 patents, but the most famous one was for a metal or glass cup that fed oil to bearings through a small-bore tube. Machinists and engineers who wanted genuine McCoy lubricators may have originated the term "the real McCoy." Elijah McCoy was born in Ontario, Canada, in 1843, the son of slaves who had fled Kentucky. He died in Michigan in 1929.

• Benjamin Banneker. Benjamin Banneker created the first striking clock made of wood in America. He became known as the "Afro-American Astronomer." He published an almanac and with his knowledge of mathematics and astronomy, he assisted in the surveying and planning of the new city of Washington, D.C.

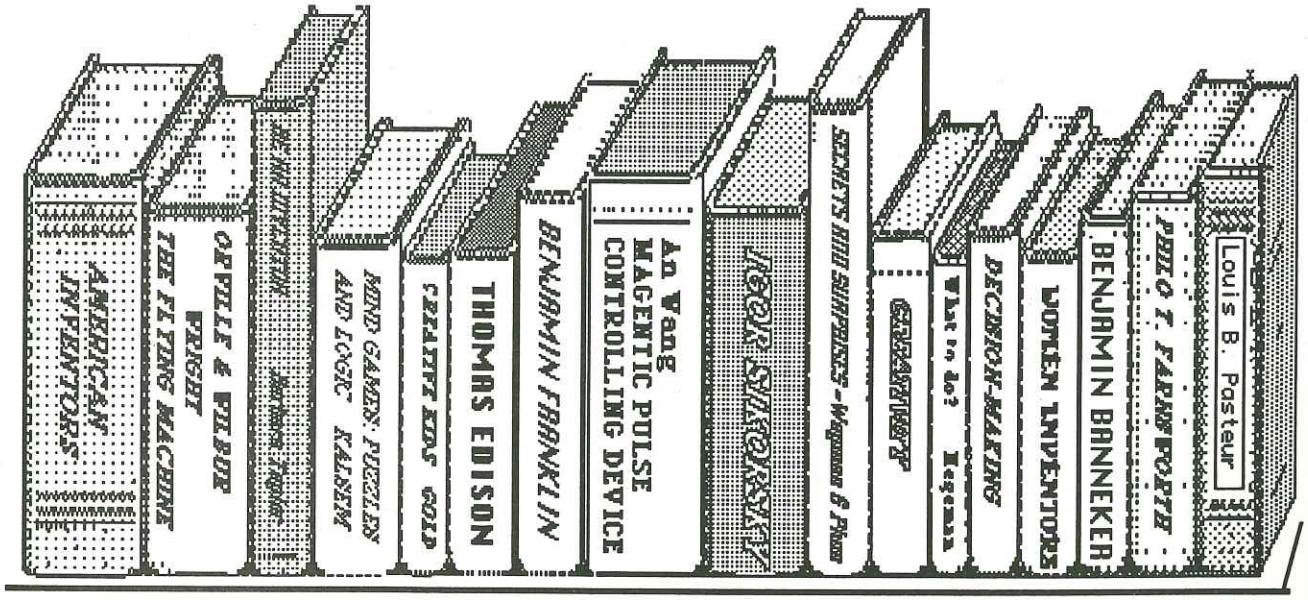
• Granville Woods. Granville Woods had more than 60 patents. Known as the "Black Edison," he improved Bell's telegraph and created an electrical motor that made the underground subway possible. He also improved the airbrake.



• Garrett Morgan. Garrett Morgan invented the traffic signal that saved thousands of lives when the automobile became popular. He also invented a safety hood for firefighters.

• George Washington Carver. George Washington Carver changed the South with his many inventions. He discovered over 300 different products made from the "peanut" which, until Carver, was considered a lowly food fit for hogs. He dedicated himself to teaching others, learning and working with nature. He created over 125 new products with the sweet potato and taught poor farmers how to rotate crops to improve their soil and their cotton. George Washington Carver was a great scientist and inventor who learned to be a careful observer and who was honored throughout the world for his creation of new things.

Read more about inventors and their discoveries at your local library.



5. OTHER PROJECTS AND COMPETITIONS

You may also wish to involve your students in other projects or competitions that promote inventive thinking and problem solving. A brief list follows:

- Invent America! (K-8)
  United States Patent Model Foundation
  510 King Street
  Suite 420
  Alexandria, VA 22314
  (703) 684-1836

- TEAMS (Tests of Engineering Aptitude, Mathematics and Science)
  Junior Engineering Technical Society (JETS) (Grades 9-12)
  1420 King Street
  Alexandria, Virginia 22314-2715
  (703) 548-JETS

- Math Counts (Grades 7, 8, 9)
  1420 King Street
  Alexandria, Virginia 22314-2715
  (703) 548-JETS

- Cognetics
  National Talent Network
  c/o Educational Information and Resource Center
  700 Hollydell Court
  Sewell, New Jersey 08080
  (609) 582-7000

- Odyssey of the Mind (K-12)
  P. 0. Box 27
  Glassboro, New Jersey 08028
  (609) 881-1603

- United States National Elementary Chess Championship
  U.S. Chess Federation (USCF)
  189 Route 9W
  New Windsor, New York 12550

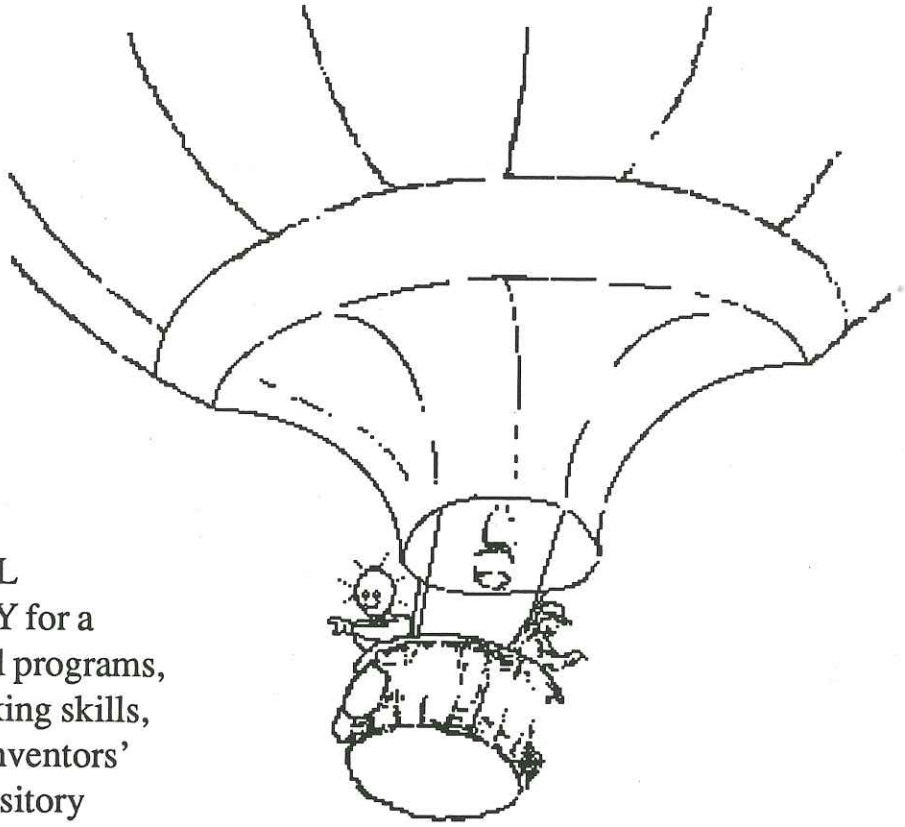
- Westinghouse Science Talent Search
  Science Service
  1719 N Street, N.W.
  Washington, D.C. 20036
  202) 785-2255

- The Weekly Reader National Invention Contest (K-8)
  245 Long Hill Road
  Middletown, Connecticut 06457
  (203) 638-2638

- The Future Problem Solving Program
  St. Andrews College
  Laurenburg, North Carolina 28352
  (919) 276-8361

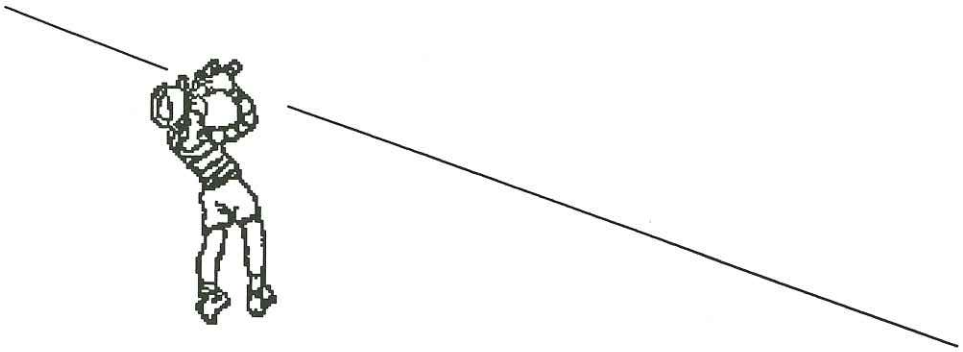
- Silver Burdett/Ginn - Invention Convention (Grades 1-6)
  250 James Street
  Morristown, New Jersey 07960-1918
  (201) 285-7894

- Duracell NSTA Scholarship Competition
  National Science Teachers Association
  1742 Connecticut Avenue, N.W.
  Washington, D.C. 20009



Write for the PROJECT XL RESOURCE DIRECTORY for a listing of exemplary school programs, contests, literature on thinking skills, thinking skills programs, inventors' organizations, Patent Depository Libraries, Patent Law Associations, a speakers' bureau, and more .....

Commissioner of Patents and Trademarks
Attention: PROJECT XL
Washington, DC
20231



PROJECT XL

COPYMASTERS

INVENTION IDEA SURVEY

One of the best ways to collect ideas for developing an innovation or invention is to take a survey. Make sure to survey a variety of people of all different ages and occupations. The more people you talk to, the more ideas you will get! The following list of questions may help you:

1. What does not work as well as you would like it to work?

2. What job(s) would you like to see solved?

3. What problem(s) would you like to see solved?

4. If you could invent something to make your life easier, what would you invent?

5. What is the most annoying problem

   at home?_____

   at school?_____

   at work?_____

   at the airport?_____

   on the road?_____

   at the supermarket?_____

   at the bank?_____

   at the shopping center?_____

   at the_____?_____

PLANNING AND DECISION-MAKING FRAMEWORK

PROBLEM - What is the dilemma?

ALTERNATIVES - Generate a list of possibilities.

PRO'S & CON'S - What reasons support and do not support the possibilities?

PRO'S:

CON'S:

CRITERIA - List the criteria for judging the alternatives.

SPECIAL EQUIPMENT - List all items such as a tape recorder, construction materials, etc., that may be required.

SOURCES OF INFORMATION -List the primary and secondary sources of information.

People:

Books, Films, Places, etc.:

FINAL PRODUCT - What form will it take? How will the results be communicated?

DECISION - What is the final decision? Why?

RESULTS - How did the plan work? What modifications, if any, took place?

PROJECT XL

SCHOOL INVENTION APPLICATION

Name:_____School:_____

Grade:_____Advisor:_____

Inventive Thinking Project Title:_____

_____

Explain how you got the idea for this invention:

How does the invention work, and how is it helpful?

What does the invention look like? Label all of the parts.

INVENTIVE THINKING CURRICULUM PROJECT

MEMORANDUM

To: The Parent(s) of_____

From: Our School_____

Subject: CREATIVITY AND IMAGINATION

You are invited to share a grand-national adventure—a learning experience parents and their children are embarking upon throughout America.

The INVENTIVE THINKING CURRICULUM PROJECT is a school activity which promotes analytical and creative thinking and problem solving. Parents can enjoy this project at home with their children by encouraging creative ideas, letting them share ideas with the family, and by assisting them with making models of their inventive ideas.

Our students will be asked to survey you, their friends, and other family members to discover a problem that needs solving. Perhaps the cap is always left off of the toothpaste or your child is always losing sneakers, pencils or mittens. Once the children find problems to solve, they will begin thinking of many ideas that might solve those problems. When they do this, they will be combining many of the skills learned in science, social studies, language, writing, art, library, math, and more.

Each student participating in the INVENTIVE THINKING CURRICULUM PROJECT will receive a certificate of recognition from the Assistant Secretary and Commissioner of Patents and Trademarks in Washington, D.C., and will share the invention with other students at our school.

Thank you for your support in this special and imaginative adventure in learning. You will be receiving more information during the school year.

_____

Teacher

_____

Principal

Certificate

of Recognition for Innovative Achievement

Presented to

Assistant Secretary and
Commissioner of Patents and Trademarks

President, Patent & Trademark
Office Society

"to promote the progress of science and the useful arts..."

Article 1, Section 8 U.S. Constitution

School Official

Presenter's Name _____

Positive Comments

What I liked most about your presentation invention was _____

_____

_____

"Praise is the best diet for us, after all..."

- Sydney Smith

Presenter's Name _____

Positive Comments

What I liked most about your presentation/invention was _____

_____

_____

"The greatest invention of the nineteenth century was the invention of the method of invention."

- Alfred North Whitehead

Inventor _____

Positive Comments

Your presentation/invention impressed me because _____

_____

_____

"The applause of a single human being is of great consequence."

- Samuel Johnson

YOUNG INVENTOR'S LOG

A log is a diary and a record of your inventive thinking. It should include everything that is related to your project. Everytime you write in the log, you should initial and date your entry and also have it signed by a witness. A witness can be anyone who knows what you are working on that day—mom, dad, friend, brother, sister, etc. The list below includes some of the items that might be recorded in your log, you will think of others. Remember, everytime you work on your project or just "think" about your idea, you should record it in your inventor's log or notebook.

Ideas for Inventions:

Problems:

Possible Solutions:

Plans:

1) What am I going to invent?
2) What steps will I need to take?
3) What materials will I need? What will the materials cost?
4) What problems might occur?
5) How will 1 present my project?

Resources:

1) Books?
2) Other References?
3) People?

Drawings of Possible Solutions:

Results of Interviews:

Results of Surveys:

Other:

PATENTS IN BRIEF

A patent is a grant issued by the U.S. Government giving an inventor the right to exclude all others from making, using, or selling his invention within the United States, its territories and possessions.

There are three kinds of patents: (1) *Utility patents*, granted to the inventor or discoverer of any new and useful process, machine, manufacture, composition of matter, or any new and useful improvement thereof; (2) *plant patents*, granted on any distinct and new variety of asexually reproduced plant; and (3) *design patents*, granted on any new, original, and ornamental design for an article of manufacture.

Utility and plant patents are effective for 17 years from the date issued, subject to the payment of maintenance fees; design patents are effective for 14 years. Patents may be extended only by special act of Congress, except for some pharmaceutical patents whose terms may be extended to make up for time lost due to Government-required testing.

The basic fee for filing an application for patent ranges from $75 to $370, dependent upon the type of patent application being filed and whether or not the applicant is entitled to status as a small entity (independent inventor, small business concern or non-profit organization). Issue fees range from $110 to $620. Maintenance fees are due at 3 1/2, 7 1/2, and 11 1/2 years from the date the patent is granted.

Applications are assigned to examiners who are experts in various fields of technology. They research previous patents and technical literature to determine whether a patent should be granted. This procedure normally takes about 18 months.

If you plan to file an application, you or your representative should make a search of patents previously granted to make sure that your idea has not already been patented. You may do this at the Public Search Room of the Patent and Trademark Office, Crystal Plaza Building No. 3, 2021 Jefferson Davis Highway, Arlington, Virginia. Hours are 8:00 am to 8:00 pm, Monday through Friday except holidays. More limited searches may be made at Patent Depository Libraries located throughout the country.

The Patent and Trademark Office strongly advises you to consult a patent attorney before attempting to file an application. Names of patent attorneys and agents may be obtained from the classified telephone directories in major cities, or from a directory published by the Government Printing Office.

DISCLOSURE DOCUMENT PROGRAM

Under its Disclosure Document Program, the Patent and Trademark Office accepts and preserves for a two-year period papers disclosing an invention pending the filing of an application for patent. This disclosure is accepted as evidence of the dates of conception of the invention, but provides no patent protection nor should it be considered a "grace period" during which the inventor can wait to file a patent application without possible loss of benefits. A fee of $6 is charged for this service.

For more information, the book *General Information Concerning Patents*, is available for $2.00 from the Superintendent of Documents, Government Printing Office, Washington, DC 20402 (doc. #003-004-00626-9)

For specific questions, write to the Public Service Center, Patent and Trademark Office, Washington, DC 20231, or call (703) 557-HELP.

U.S. DEPARTMENT OF COMMERCE • PATENT & TRADEMARK OFFICE

Note: Fees are current as of Spring 1990, but are subject to change.

TRADEMARKS IN BRIEF

A trademark (or brand name or logo) is a word, name, symbol, design, combination of word and design or slogan used by a manufacturer or merchant to identify its goods or services and distinguish them from those manufactured or sold by others. When it is used for services, it can be called a service mark.

Trademark rights come from using the mark, and marks are protected under common law from the time they are first used. While there is no requirement to do so, owners of marks who have used them or have a bona fide intention to use them in federally regulated commerce may register them with the Patent and Trademark Office. This provides the owners with certain procedural and legal advantages. For "intent-to-use applications, actual use of the mark in comerce is a prerequisite to the ultimate issuance of a registration.

Many trademark owners use a TM or SM symbol with their mark to indicate that they are claiming rights in it. The ® symbol may only be used if the Patent and Trademark Office issues a Federal registration. To register a mark, the owner must file an application consisting of a written statement in which the owner indicates among other things the goods or services in connection with which the mark is used and the date of first use of the mark in commerce; a drawing of the mark; five specimens showing the mark as it is actually used (labels, tags, packaging, etc.); and the required filing fee of $175 per class.

Each application is reviewed by an examining attorney to determine if the mark is eligible for registration and is compared with other marks to determine if it is likely to cause confusion with those already registered. If a proposed mark passes the examination, it is then published in the *Official Gazette* of the Patent and Trademark Office. Those who believe they will be damaged by registration of the mark then have an opportunity to oppose registration. If no opposition is filed, a registration certificate is issued or a notice of allowance is issued to the applicant in an "intent-to-use" application. Within six months after the issuance of the notice of allowance, the applicant must file specimens evidencing use of the mark in commerce, a fee of $100, and a verified statement that the mark is in use in commerce before a registration certificate is issued. The registration may be renewed every 10 years as long as the registrant is still using the mark.

For further information and an application form, write to the Public Service Center, Patent and Trademark Office, Washington, DC 20231, or all (703) 557-HELP.

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Note: Fees are current as of Spring 1990, but are subject to change.

APPENDIX

1. Article 1, Section 8, Clause 8 of the U.S. Constitution.

2. Copy of the first U.S. patent issued and signed by George Washington in 1790.

3. Copy of Abraham Lincoln's utility patent issued in 1849. Abraham Lincoln was the only U.S. President to be granted a U.S. patent.

4. Lincoln's quote about the patent system.

5. Copy of Orville and Wilbur Wright's utility patent issued in 1906 for the flying machine.

6. Copy of a design patent issued to Auguste Bartholdi in 1879 for Liberty Enlightening the World (the Statue of Liberty)

The Constitution of the United States of America

Article 1, Section 8, Clause 8

The Congress shall have the power—
to promote the progress of science and
useful arts by securing for limited
times to authors and inventors the
exclusive right to their respective
writings and discoveries.

C. Sims

The First Patent Grant in the United States

The patent grant you see reproduced here was the first one issued by the United States, to Samuel Hopkins of Pittsford, Vermont in 1790. Two other patents were granted that year: one for a special process of making candles and one for improved flour milling machinery. The Hopkins patent was for an "Improvement, not known before such Discovery, in the making of Pot ash and Pearl ash by a new Apparatus and Process", and was granted for a term of fourteen years.

The name potash refers to several potassium salts, mild alkalis, which were derived from the ashes of timber or other plants. It was also known in a caustic form when mixed with lime. In reacting with fats or oils, potash produced a soft soap. It was an essential ingredient in the manufacture of glass, alum (salts of aluminum—used chiefly in medicine), and saltpetre (an important ingredient in gun powder). Potash also played an important role in bleaching, mining, metallurgy, and other industrial interests. Its many applications served as an indication of the emerging chemical industry in the nineteenth century.

In the summer of 1956, the Vermont Historic Sites Commission erected a marker at the former residence of Samuel Hopkins. The original patent granted to him still exists in the collections of the Chicago Historical Society. We hope you will enjoy this souvenir grant (which can be detached and framed).

The United States.

To all to whom these Presents shall come Greeting.

Whereas Samuel Hopkins of the City of Philadelphia and State of Pensylvania hath discovered an Improvement, not known or used before such Discovery, in the making of Pot ash and Pearl ash by a new Apparatus and Process; that is to say, in the making of Pearl ash 1st by burning the raw Ashes in a Furnace, 2d by dissolving and boiling them when so burnt in Water, 3rd by drawing off and settling the ley, and 4th by boiling the ley into Salts which then are the true Pearl ash; and also in the making of Pot ash by fluxing the Pearl ash so made as aforesaid; which Operation of burning the raw Ashes in a Furnace, preparatory to their Dissolution and boiling in Water, is new, leaves little Residuum; and produces a much greater Quantity of Salt: These are therefore in pursuance of the Act, entitled "An Act to promote the Progress of useful Arts", to grant to the said Samuel Hopkins, his Heirs, Administrators and Assigns, for the Term of fourteen Years, the sole and exclusive Right and Liberty of using and vending to others the said Discovery, of burning the raw Ashes previous to their being dissolved and boiled in Water, according to the true Intent and Meaning of the Act aforesaid. In Testimony whereof I have caused these Letters to be made patent, and the Seal of the United States to be hereunto affixed. Given under my Hand at the City of New York this thirty first Day of July in the Year of our Lord one thousand seven hundred & Ninety.

G. Washington

City of New York July 31st 1790.

I do hereby Certify that the foregoing Letters patent were delivered to me in pursuance of the Act, entitled "An Act to promote the Progress of useful Arts"; that I have examined the same, and find them conformable to the said Act.

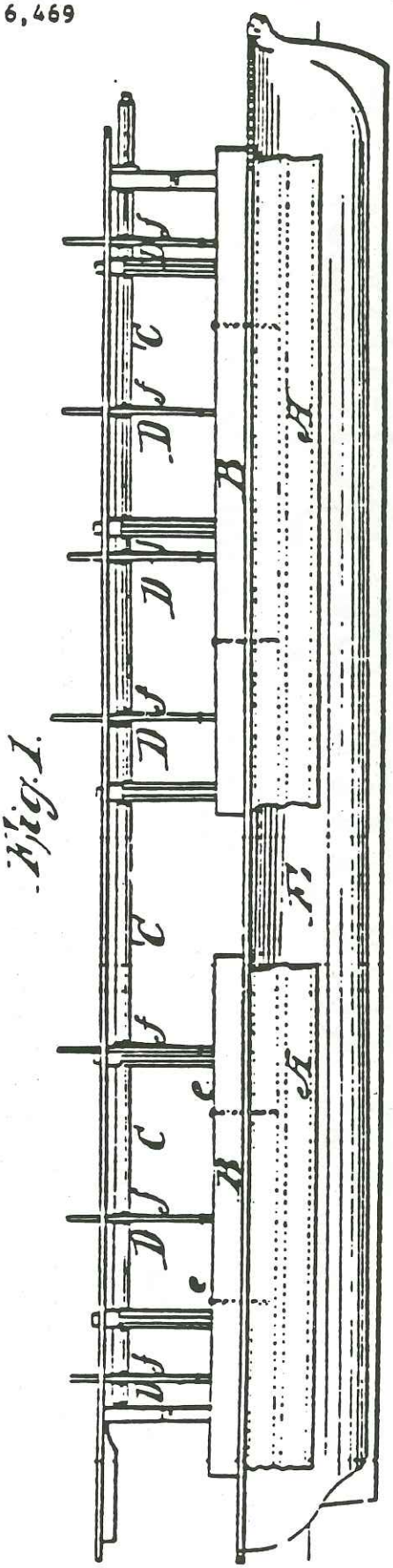
Edm: Randolph Attorney General for the United States.

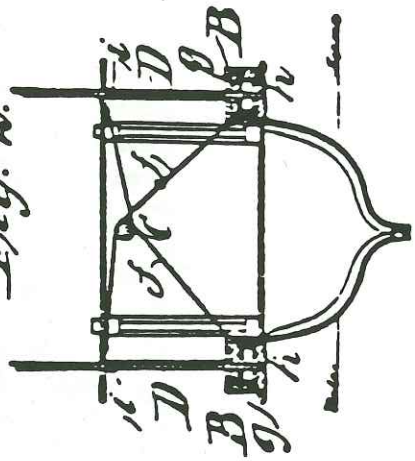
ABRAHAM LINCOLN

MANNER OF BOUYING VESSELS

No. 6,469

Patented May 22, 1849





The patent system added the fuel of interest to the fire of genius.

L. SIMS

Abraham Lincoln

No. 821,393. PATENTED MAY 22, 1906.

O. & W. WRIGHT.

FLYING MACHINE.

APPLICATION FILED MAR. 23, 1903.

3 SHEETS—SHEET 1.

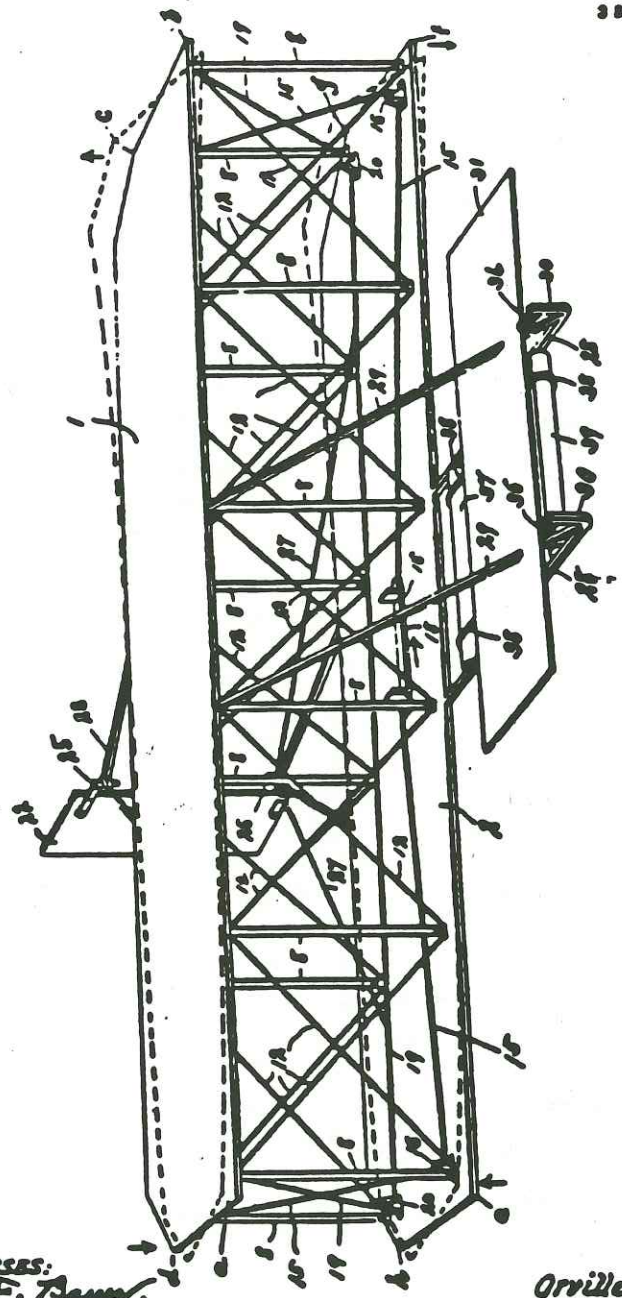


FIG. 1.

WITNESSES:
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Louise Miller.

INVENTORS.
Orville Wright
Wilbur Wright
BY
H. A. Toulmin
ATTORNEY.

DESIGN.

A. BARTHOLDI.

Statue.

No. 11,023. Patented Feb. 18, 1879.

LIBERTY ENLIGHTENING THE WORLD.

E. F. Brick

J. E. Carpenter.

Auguste Bartholdi

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atty.

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